FORMULATION AND EVALUATION OF POLYHERBAL HAND WASH GEL

Author: Triveni Katre,* Neha Bisen, Shraddha Katre, Prameshwar Wankhede, Tulsidas Nimbekar, Jitendra Shivankar

SHRI LAXMANRAO MANKAR INSTITUTE OF PHARMACY, AMGAON

DIST GONDIA-441902

Corresponding author: Triveni Katre

ABSTRACT:

In today's world, where health and hygiene have become more complex than ever, hand hygiene is a simple and effective measure to prevent illness and promote well-being.

The primary aim of developing polyherbal hand wash with gel basis is to promote “personal hygiene

Hands are primary mode of transmission of microbes and infections. Hand washing is critical in food production, food service and also important in health care settings, homes and day care preparations.

Hand sanitizer is not able to kill all types of germs where Hand wash Gel kill all germs and able to hydrated the skin and keep it fresh. Also, our formulated Hand wash gel contains herbal leaf extract of Neem leaves, Guava leaves (*Psidium guajava* L.) and Aloe vera.

To protect the skin from harmful micro organisms and to prevent the spreading of many contagious diseases, hand washing is absolutely an important precaution .

INTRODUCTION:

Hand wash gel is a thicker in consistency than liquid soap, often containing plant-based surfactants, moisturizers, and sometimes essential oils for fragrance. Formulation of hand wash gels is best choice for those seeking both gentle care and effective cleaning.

Hand hygiene involves cleaning the hands to remove dirt, germs and other contaminants. The Centers for Disease Control and Prevention (CDC) emphasizes that proper hand washing is crucial to preventing the transmission of pathogens. This is especially important at a time when we are more aware of the spread of viruses and bacteria.

Regular hand washing can prevent respiratory infections, gastrointestinal problems and other infectious diseases, making it one of the most effective ways to protect ourselves and those around us.

Why it's important?

Washing hands can keep you healthy and prevent the spread of respiratory and diarrheal infections. Germs can spread from person to person or from surfaces to people when you:

- Touch your eyes, nose, and mouth with unwashed hands
- Prepare or eat food and drinks with unwashed hands
- Touch surfaces or objects that have germs on them

Blow your nose, cough, or sneeze into hands and then touch other people's hands or common objects

Aim:

The primary aim is to develop poly-herbal hand wash gel

- To kill Germs and microorganisms that can harm our body through hands.
- Develop an effective education and credentialing system to improve knowledge about hand hygiene and infection control.

OBJECTIVES:

- To achieve sustained improvement in hand hygiene compliance ratio
- To kill germs and microorganism that can harm our body
- It will help to learn their illness is often caused by germs are travel from their hands to their mouth, eye, nose etc.
- Reduces the rates of healthcare associated infections

HERBAL INGREDIENTS AND THEIR ROLE:

INGREDIENTS	ROLE
Neem leaves	Antimicrobial activity
Guava leaves	Antimicrobial activity
Aloe Vera gel	Moisturizing agent and Gelling agent
Reetha	Foaming agent
Glycerin	Softening agent
methyl paraben	Preservatives
Distilled water	Vehicle
Rose oil	Perfume

MATERIALS:

NEEM LEAVES :

- **Biological source:** Neem consists of almost all the part of the plant which are used as drug of *Azadirachta Indica.*
- Belonging to family **meliaceae.**
- It is a multi-purpose tree.
- They have a bitter taste
- Neem leaves are used traditionally and they are also used as a natural insecticide and pesticide in agriculture.
- Also having a anti-inflammatory, antimicrobial, and antioxidant activity.

GUAVA LEAVES:

- **Biological name**: - *Psidium guajava folium*
- **Family**: - Myrtaceae
- Guava leaves are used in traditional medicine and have a antioxidant, antimicrobial, anti-inflammatory activity.

ALOE VERA:

- **Biological NAME: -** *Aloe vera*
- **Family: -** Liliaceae
- **Synonym Name: -** Grithikumari
- Aloe vera is a succulent plant with a gel-like substance in its leaves, known for its medicinal and cosmetic properties. It's widely used for topical applications like soothing sunburns, treating minor wounds, and moisturizing skin.

REETHA:

- **Biological Name:** *Sapindus Mukorossi*

- **Common Names:** Soap nut, soapberry, wash nut, Arishtak (in Ayurveda)
- It's a common ingredient in Ayurvedic practices and is primarily used for hair and skin cleansing. The fruit shells contain saponin, a natural surfactant that provides cleansing and foaming properties.

GLYCERIN: Glycerin helps retain moisture in the skin, leaving it feeling soft, supple and hydrated. Glycerin has anti-inflammatory properties that can help soothe and calm irritated skin.

METHYL PARABEN: methyl paraben is a widely used antimicrobial preservative, a type of paraben, commonly found in cosmetics, food, and pharmaceuticals, known for its ability to prevent the growth of bacteria and fungi.

ROSE OIL : Rose oil is an essential oil extracted from the petals of various species of roses, primarily Rosa damascena (Damask rose)and Rosa centifolia (Cabbage rose) belonging to family Rosaceae .It is highly valued for its pleasant, floral, and sweet fragrance, and is widely used in aromatherapy, cosmetics, and perfumery.

PREPARATION OF POWDERS:

- **NEEM AND GUAVA LEAVES:** Collect the Neem and Guava leaves which are required for the preparation of polyherbal hand wash gel, clean with water and dried in room temperature and grind into fine powder form.

FIG. NEEM

FIG. GUAVA LEAVES

FIG.REETHA

Reetha :

- The reetha nuts are collected from the trees,
- The cleaned nuts are spread out to dry in the sun to remove moisture.

- The dried reetha nuts are grind using a traditional grinding method, such as stone grinding, to produce the powder.

METHOD OF EXTRACTION FOR NEEM AND GUAVA LEAVES

Preparation of powder:

Fresh leaves are collected, washed and shade dried at room temperature. These leaves are placed in mixer to make a fine powder.

- Solvents: Ethanol and distilled water use for extraction process In 70:30 ratio
- Procedure :

- Take 35 gm powder in thimble Of Soxhlet apparatus were extracted 500ml of round bottom flask.
- It takes 24 hrs for extraction process .
- Then collect extract and placed in refrigerator.
- Extract was filtrated by using simple filter paper and funnel twice.
- Extract was allowed to evaporate with the help of hot plate to get concentrated desired extract.

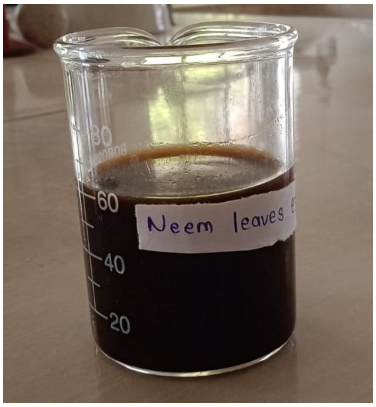

Fig: Extraction Process For Neem leaves

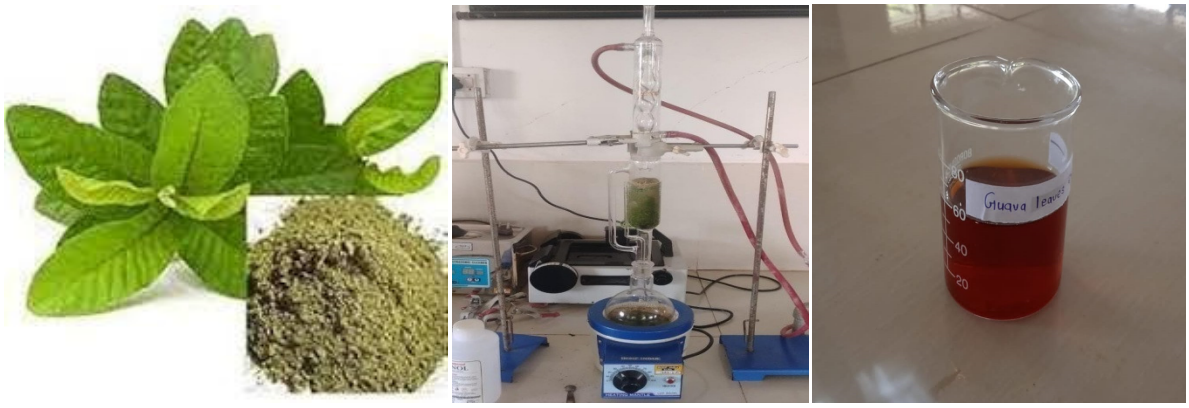

Fig: Extraction Process For Guava Leaves

ALOE VERA: for the extraction of aloe vera gel, wash a fresh leaf, remove the outer rind and thorny edges, and then scoop out the clear, inner gel with a knife or spoon.

- **Store in a container:** Place the extracted gel in a clean, airtight container.
- **Refrigerate:** Store the gel in the refrigerator for up to 7-10 days.

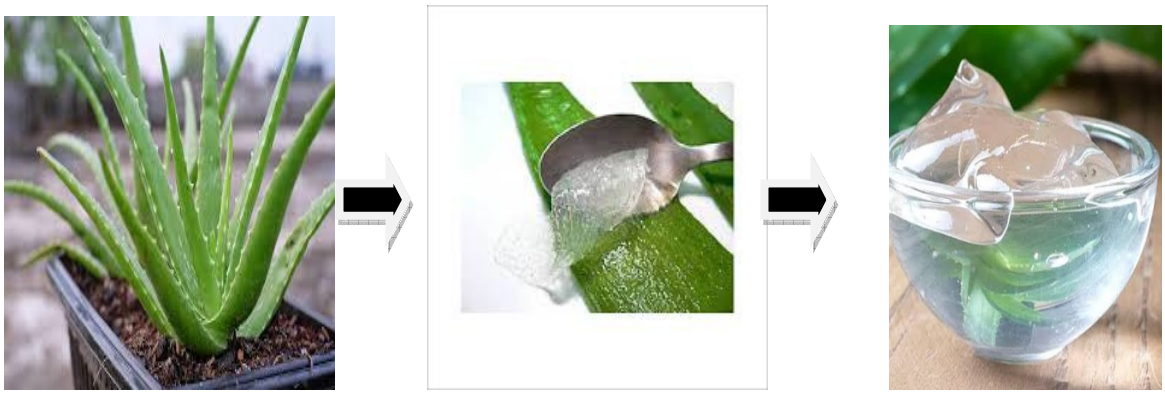

FIG. ALOEVERA

PREPARATION OF HAND WASH GEL :

- Take 10 ml extract of Neem leaves and 10 ml Guava leaves obtain from the Soxhlet process and mix with slightly heating .
- After heating solution kept aside for 5-8 mins. Then Reetha powder (2 gm) added in 5 ml distilled water then glycerin (3 ml) were added in above phase with constant stirring
- Then add 20 ml aloe vera gel.
- Add methyl paraben use as a preservative.
- Mix the extract to make homogenous gel.
- Add Rose oil as a fragrance.

Fig: Polyherbal hands wash gel

FORMULATION TABLE:

Sr No.	Ingredients	Quantities		
		F1	F2	F3
1	NEEM LEAVES EXTRACT	10 ml	10 ml	10 ml
2	GUAVA LEAVES EXTRACT	10ml	10 ml	10 ml
3	ALOE VERA	10 ml	15 ml	20 ml
4	REETHA POWDER	3 gm	4 gm	4.5 gm
5	GLYCERINE	2.5 ml	3 ml	3.5 ml

6	METHYL PARABEN	0.5 gm	0.5 gm	0.5 gm
7	DISTILLED WATER	10 ml	10 ml	10 ml
8	ROSE OIL	q.s	q.s	q.s

Antimicrobial activity:

- firstly sterilized the petri plate at 121^0C for 15 min
- Respective test pathogen suspension was prepared in sterile saline.
- Inoculate in Petri plate and allow to solidify.
- Pathogens are added on the surface of nutrient agar plate with the help of sterile cork borer.
- Incubate the plates for 24-48 hours at appropriate temperature
- Measure the zone of inhibition.

Test Organisms	**Zone of Inhibitions in mm**
Staphylococcus aureus	**30**
E. coli .	**32**

Fig. S. aureus bacteria test

Table : preliminary phytochemical screening of phytoconstituents.

Sr.no	Chemical constituent	Test performed	Observation	inference
1	Alkaloid	a. Hager's test	Yellow cream ppt	Present
		b. Wagner's test	Reddish brown ppt	Present
2	Flavonoid	Lead acetate test	Brown ppt	Present
3	Tannins	a. Fecl3 test	Brownish green colour	Present

		b. Gelatin test	Buff coloured ppt	Present
4	Saponin	Froth formation test	A small height froth was not formed	Absent
5.	Carbohydrate	a. Fehling's test	Brown-red ppt	Present
		b. Benedict's test	Bluish-green ppt	Present
6.	Phenol	Fecl3 test	Bluish-black	Present
7.	Protein	a. Xanthoproietic test	No yellow colour observed	Absent
		b. Ninhydrin test	No purple color observed	Absent
8.	Anthocyanide	Hcl test	Pale pink colour observed	Present
9.	diterpene	Copper acetate test	No emerald green colour	Absent
10.	Triterpene	Salkowski test	No yellow colour observed	Absent

Fig: Photochemical Test For Neem Leaves Extract

EVALUATION TEST:

EVALUATION OF HERBAL HAND WASH GEL :

1. Organoleptic test

- Organoleptic test includes color, texture and odour was evaluated by
- a. Colour- Visual inspection
- b. Texture- Touch sensation
- c. Odour- By nosing

2. Homogeneity and Appearance

- Homogeneity and appearance were evaluated by visual surveillance.

3. Test for skin irritation

Test for skin irritation was carried out was by applying Polyherbal Hand wash Gel on hand for 30 min, after 30 minutes of washing observe any itching, rashes or redness on hand by visual surveillance.

4. Spreadability test

Polyherbal Hand wash Gel (0.5 gm) was kept and pressed between two glass slides and left for 5 mins were no more spreading. Diameter of spreaded circle was measured in cm.

5. Test for Grittiness

- 1 ml of hand wash gel was taken between two finger tips and rubbed it then evaluated the formulation

6. **Viscosity:** viscosity of liquid was determined using Brookfield Viscometer.

7. **PH:** 1ml Of Sample Of Herbal Hand Wash gel Was Taken And Dissolved It Into 50 Ml Distilled Water. The pH of Solution Was Taken in Previously Standardized Digital pH Meter. Ph of the polyherbal hand wash gel is 6.6.

8.. **Stability:** the stability of herbal hand wash liquid was carried out by storing measured amount of liquid at room temperature for one week. During stability studies no change in colour and no phase separation were observed in the formulated hand wash.

Parameter	Initial study	**25 ℃**	**37 ℃**	**40 ℃**
Nature	Smooth	Smooth	Smooth	Smooth
colour	Brownish green	Brownish green	Brownish green	Brownish green
odour	Rose like	Rose like	Rose like	Rose like
texure	Smooth	Smooth	Smooth	Smooth

Result:

The polyherbal hand wash gel were successfully formulate and evaluated using Neem and Guava leaves extract , Aloe Vera Gel , Reetha ,Glycerin , Methyl Paraben And Rose Oil . . The hand wash exhibited desirable physical characteristics, including a pleasant appearance, fragrance, and suitable pH and viscosity. Furthermore, it demonstrated significant antimicrobial efficacy against tested microorganisms. User perception evaluations indicated high levels of satisfaction in terms of cleansing efficacy, fragrance, and overall experience. F3 is better than F1 and F2.

CONCLUSION:

Due to various diseases and germs, bar soap can become contaminated by touching it naked, which may lead to the spread of germs. Hand wash gel is used much more frequently than bar soap. Hands are the primary source of disease related to skin, respiration Etc. Hand wash gels that can provide effective cleansing and disinfection while being gentle on the skin. Thus, it can be concluded that the herbal hand wash formulation is an effective and well-accepted alternative to conventional hand washes, offering natural antimicrobial properties while providing a refreshing and pleasant sensory experience.

REFERENCE:

1. Anne Waugh, Allison Grant, A textbook of Anatomy and Physiology in Health and illness, Elsevier, 12th edition, page no.362.
2. Anita Sharma, Niraj Terkar, Jatin Tekawade, formulation and evaluation of polyherbal hand wash gel, International journal of science and research (IJSR), 2021 Aug;10(8):1213-1219.
3. Biswas B, Rogers K, McLaughlin F, Daniels D, Yadav A. Antimicrobial activities of leaf extracts of Guava (*Psidium guajava L.) on two gram-negative and gram-positive bacteria. International journal of microbiology. 2013 Oct 20;2013.*
4. . Debbarma D, Moharana P, Mishra B, Ramana V, Dimple W. Clinical review of deep cleansing apricot scrub: an herbal formulation. International Journal of Bioassay. 2015; 4(9):4251-253.
5. Dr.Hingane L.D Formulation And Evaluation Of Herbal Hand Wash By Using Natural Ingredients By Simple Method, International Journal Of Creative Research,2021,9, (12)pp.22
6. Hufford CD, Funderburk MJ, Morgan JM, Robertson LW. Two antimicrobial alkaloids from heartwood of *Liriodendron tulipifera L. Journal of Pharmaceutical Sciences. 1975 May 1;64(5):789- 92.*

7. . Jayant L, Shital DJ, Chetan D, Diksha J, Formulation of herbal hand wash with potential antibacterial activity. Int J Res Adv Tech. 2 (2), 2015, 11 - 15.

8. 8. Jyothi MJ, AV Praveen Kumar AV, Mohandas lakshmi S, Prathyusha S. formulation and evaluation of poly herbal hand wash. Int J Pharm. 2(2); 2012: 39-43.6.

9. Sandeep Ds, Narayana Charyulu R Formulations Of Antimicrobial Polyherbal Hand Wash, Research Journal Of Pharmacy And Technology, 2016, 9, (7) pp.45

10. Tushar Rukari, Neha Pawar, Swapnali Gawas, Jaydeep Bhoite, Priyanka Jadhav, Saylee Madkholkar, Vijay Jagtap Study In-Vitro Antimicrobial Activity Of Polyherbal Hand wash Formulation Asian Journal Of Pharmacy And Technology.2022,12, (3)pp.56

11. Sachin Jalindar Fartade, Aniket Balaprasad Dode, Mahesh Arjun Garje, Pratima Santoshkumar Ladda, Vaibhav Murlidhar Kewatkar And Shubhangi Sharadrao Way a formulation, Development And Evaluation Of Dual-Purpose Antimicrobial Polyherbal Gel: Facewash And Hand wash world Journal Of Pharmaceutical And Medical Research ,2020,198,(2020) pp.245
12. Some Google image added in material.
13. Google scholar
14. Pubmed